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EXAMINER

WARREN, MATTHEW E

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/300,363

Applicant(s)

IRELAND ET AL.

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-25 is/are allowed.
- 6) ☒ Claim(s) 8-13 is/are rejected.
- 7) ☒ Claim(s) 2-6 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 19.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

This Office Action is in response to the Amendment filed on May 15, 2003.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 8-10, 12, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Jeng et al. (US 5,792,687).

Jeng et al. shows (figs. 5-11) a contact structure comprising a lower bulk insulator layer (22) situated above a substrate (2), the lower bulk insulator layer having upper and lower surfaces, a conductor layer (24) above the lower bulk insulator layer, and an upper bulk insulator layer (70) above the lower bulk insulator. A sleeve insulator layer (30) of SiN is in contact with the bulk insulator and the conductor layer. The sleeve insulator has a first terminus (top of spacer 30) and second terminus (bottom of spacer 30) opposite the first terminus and located between the upper and lower surface of the bulk insulator. A conductive contact (40) extending from and beyond the sleeve insulator layer to terminate at a contact (16) on the semiconductor substrate, the

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conductive contact being electrically insulated from the conductor layer (24) by the sleeve insulator layer. The conductor is at least partially circumscribed by and is in contact with the sleeve insulator layer. Each of the lower bulk insulator layer and conductor layer has a sidewall in contact with the sleeve insulator layer. The conductor structure extends from the sleeve insulator to make contact with a dielectric layer (22).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al. (US 5,792,687) as applied to claim 1 above, and further in view of Ohsaki (US 6,198,143 B1).

Jeng shows all of the elements of the claims except the refractory metal silicide on the active area. Ohsaki shows (fig 1) a contact structure for a semiconductor device in which a conductive plug (11) is in contact with a refractory metal silicide (6). The silicide is formed on active region (5) of the device to reduce the contact resistance (col. 1, lines 19-63). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Jeng with a refractory metal silicide because Ohsaki teaches that refractory metal silicides are desirable materials for lowering the contact resistance of a device.

***Allowable Subject Matter***

Claims 15-25 are allowed.

Claims 2-6 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the Declaration filed on May 15, 2003 is sufficient to remove Lee et al. (US 6,165,839) as a reference for the previous 103 rejection. Therefore the prior art references, alone or in combination, do not show a contact structure for an integrated circuit comprising a dielectric layer above a lower bulk insulator layer, a conductor layer above the bulk insulator layer and above the dielectric layer, an electrically insulating layer upon the conductor layer, a sleeve insulator layer in contact with the lower bulk insulator layer and conductor, wherein the sleeve comprises a second terminus opposite a first terminus, the second terminus located between the upper and lower surfaces of the lower bulk insulator layer (as it pertains to independent claims 15 and 22. With respect to claim 19, the prior art references do not show a sleeve insulator layer insulating a capacitor cell plate from an electrically conductive plug, the sleeve insulator layer in contact with a capacitor storage node, capacitor dielectric, and the capacitor cell plate, wherein the sleeve insulating layer comprises a second terminus opposite a first terminus, the second terminus separated from the semiconductor substrate and in contact with the capacitor storage node.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Response to Arguments***

Applicant's arguments, see pages 1-4, filed May 15, 2003, with respect to the rejection(s) of claim(s) 1-25 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Jeng et al. with respect to claims 1-13.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (703) 305-0760. The examiner can normally be reached on Mon-Thurs, and alternating Fri, 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MEW

*MEW*

August 21, 2003